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RE: Draft NPDES Permit for Offshore Oil and Gas Operations in the Western Portion of the Outer Continental Shelf of the Gulf of Mexico, General Permit No. GMG290000, EPA-R06-OW-2017-0217

Dear Ms. Rosborough:

The Center for Biological Diversity ("Center") submits the following comments to Region 6 of the Environmental Protection Agency ("EPA") on the Draft National Pollutant Discharge Elimination System ("NPDES") General Permit for New and Existing Dischargers in the Offshore Subcategory of the Oil and Gas Extraction Point Source Category for the Western Portion of the Outer Continental Shelf of the Gulf of Mexico, General Permit No. GMG290000 ("Proposed Permit"). The Western Gulf of Mexico is littered with thousands of offshore oil and gas platforms, thousands of miles of offshore pipelines, and tens of thousands of offshore wells—the largest concentration of offshore oil and gas activity in the country. While the Center appreciates EPA's new permit condition requiring oil companies to maintain an inventory of the chemicals used in offshore hydraulic fracturing ("fracking") and other well stimulation treatments, such condition does not go nearly far enough to protect Gulf ecosystems or marine species from these environmentally destructive practices.

The Center urges EPA to prohibit the dumping of chemicals used in offshore fracking and other well stimulation into the Gulf, and implement a zero discharge requirement for wastewater generated by offshore oil and gas drilling activities, including drill cuttings and fluids, well treatment fluids, and produced water. Such action is necessary to ensure the Proposed Permit does not result in an unreasonable degradation of the marine environment as required by the Clean Water Act ("CWA"), particularly given the enormous scale of offshore oil and gas drilling conducted in the Western Gulf under the jurisdiction of Region 6.

Moreover, prior to issuing the permit, EPA must prepare an environmental impact statement under the National Environmental Policy Act ("NEPA") and must engage in formal consultation under the Endangered Species Act ("ESA"). These evaluations under NEPA and the ESA are necessary to ensure that EPA carefully considers the risks and harms inherent in

discharging fracking chemicals and other drilling wastes into the Gulf, including the cumulative impacts of the discharge of wastewater from thousands of active drilling platforms; that the public is made aware of such risks; and that the marine environment and imperiled marine species are sufficiently protected from the myriad dangerous pollutants discharged by offshore oil and gas drilling activities. Failure to do so would violate NEPA and the ESA.

I. EPA's Proposed Permit Fails to Comply with the Clean Water Act

The Proposed Permit does not adequately protect water quality or the ocean environment and therefore fails to comply with the CWA. Congress enacted the CWA in order "to restore and maintain the chemical, physical, and biological integrity of the nation's waters;" to guarantee "water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation;" and to promptly eliminate water pollution.[1] To help meet these goals, the CWA establishes the NPDES permitting program. Specifically, under Section 301, "the discharge of any pollutant by any person shall be unlawful," unless the discharger meets one of several exceptions, which includes obtaining a permit issued pursuant to Section 402.[2] "The combined effect of sections 301(a) and 402 is that '[t]he CWA prohibits the discharge of any pollutant from a point source into navigable waters of the United States without an NPDES permit'"[3]

Every NPDES permit must contain effluent limits sufficient both to "restore" and "maintain" the receiving waterbody.[4] In particular, the CWA requires EPA to set technology-based effluent limits that reflect the ability of available technologies to reduce and ultimately eliminate pollution discharges.[5] All sources and all pollutants must be subject to technology-based effluent limits,[6] unless more stringent water quality-based effluent limits are required to avoid exceedances of water quality standards.[7]

To implement the CWA's tech-based effluent limit requirements, EPA must establish national effluent limitations and guidelines ("NELGs") for industrial point sources, which establish an absolute minimum level of pollution control that must be achieved by industrial point sources.[8] EPA looks first to the NELGs when setting technology-based effluent limits.[9] Where NELGs do not exist for a particular pollutant or class of pollutants to be discharged from a point source, EPA is required to exercise their best professional judgment ("BPJ") to set case-by-case technology-based effluent limits for pollutants in NPDES permits.[10]

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[1] 33 U.S.C. § 1251(a).
[2] 33 U.S.C. § 1301(a).
[3] *Nw. Evtl. Advocates v. EPA*, 537 F.3d 1006, 1010 (9th Cir. 2008) (citations omitted).
[4] *See* 33 U.S.C. § 1251(a).
[5] *See id.* §§ 1311 (establishing technology-based effluent limits),1342(a)(1) (requiring that NPDES permits incorporate technology-based effluent limits).
[6] *See id.* § 1311(b)(2)(A),.
[7] *See id.* § 1312(a).
[8] 33 U.S.C. §§ 1311(b), 1314(b); *See Natural Res. Def Council v. EPA,* 859 P.2d 156, 183 (D.C. Cir. 1988).
[9] *See id.*
[10] 33 U.S.C. §§ 1311(b)(2)(A); 1342(a)(1)(A); 40 C.F.R. § 125.3(c); *see also Am. Petroleum Inst. v. EPA,* 787 P.2d 965, 969 (5th Cir. 1986) ("Where EPA has not promulgated applicable technology-based effluent limitations guidelines, the permits must incorporate, on a case-by-case method, 'such conditions as the Administrator determines are necessary to carry out the provisions of the Act.'") (citations omitted).

In addition, in order to provide enhanced protections for marine waters, Section 403 of the CWA establishes ocean discharge criteria.[11] Congress directed EPA to publish regulations and guidelines for determining degradation of the "waters of the territorial sea, the contiguous zone, and oceans…."[12] Under the ocean discharge criteria, EPA cannot issue a discharge permit where the discharge would cause "undue degradation of the marine environment."[13]

The Proposed Permit does not comply with the ocean discharge criteria or adequately protect water quality because it allows the unlimited discharge of produced water; it allows the discharge of toxic fracking and other well treatment fluids; it allows the discharge of drill cuttings and fluids; and is less protective of water quality than other offshore oil and gas permits. It is wholly shocking that EPA allows the oil and gas industry to dump its wastewater into the Gulf of Mexico. This is a serious disloyalty to the public and its reliance on the agency to protect water quality. EPA must therefore implement substantial changes to the terms and conditions of the Proposed Permit prior to its issuance, including zero-discharge requirements for all drilling fluids, produced wastewater and well treatment fluids.

A. EPA's Proposed Permit Fails to Comply with the Ocean Discharge Criteria

EPA cannot issue the Proposed Permit because EPA cannot make a valid finding that the permit complies with the CWA requirements for discharges into the ocean. Permits for ocean discharges must comply with ocean discharge criteria.[14] EPA can only issue a permit if it concludes "on the basis of available information" that the discharge "will not cause an unreasonable degradation of the marine environment."[15] The CWA specifically prohibits EPA from issuing a NPDES permit that would allow the discharge of pollutants into the ocean where "insufficient information exists on any proposed discharge to make a reasonable judgment on any of the guidelines…."[16]

Unreasonable degradation is defined in 40 C.F.R. § 125.121(e)(1-3) as:

(1) Significant adverse changes in ecosystem diversity, productivity and stability of the biological community within the area of discharge and surrounding biological communities;
(2) Threat to human health through direct exposure to pollutants or through consumption of exposed aquatic organisms; or
(3) Loss of esthetic, recreational, scientific or economic values which is unreasonable in relation to the benefit derived from the discharge.

The following factors must be considered in the evaluation:[17]

[11] 33 U.S.C. § 1343.
[12] *Id*. § 1343(c)(1).
[13] 40 C.F.R. § 125.123.
[14] 33 U.S.C. § 1343.
[15] 40 C.F.R. § 125.123(a).
[16] 33 U.S.C. § 1343(c)(2).
[17] 40 C.F.R. §125.122(a).

(1) The quantities, composition and potential for bioaccumulation or persistence of the pollutants to be discharged;
(2) The potential transport of such pollutants by biological, physical or chemical processes;
(3) The composition and vulnerability of the biological communities which may be exposed to such pollutants, including the presence of unique species or communities of species, the presence of species identified as endangered or threatened pursuant to the Endangered Species Act, or the presence of those species critical to the structure or function of the ecosystem, such as those important for the food chain;
(4) The importance of the receiving water area to the surrounding biological community, including the presence of spawning sites, nursery/forage areas, migratory pathways, or areas necessary for other functions or critical stages in the life cycle of an organism.
(5) The existence of special aquatic sites including, but not limited to marine sanctuaries and refuges, parks, national and historic monuments, national seashores, wilderness areas and coral reefs;
(6) The potential impacts on human health through direct and indirect pathways;
(7) Existing or potential recreational and commercial fishing, including finfishing and shellfishing;
(8) Any applicable requirements of an approved Coastal Zone Management plan;
(9) Such other factors relating to the effects of the discharge as may be appropriate; and
(10) Marine water quality criteria developed pursuant to section 304(a)(1).

Here, EPA relies on conclusory statements in its Fact Sheet on the Proposed Permit and a document from 1991 evaluating the ocean discharge criteria for the NPDES General Permit for the Gulf of Mexico OCS to find that the Proposed Permit satisfies the ocean discharge criteria. EPA's conclusion that the Proposed Permit meets the ocean discharge criteria and does not constitute an unreasonable degradation of the marine environment is inadequate and flawed.

EPA cannot make a valid finding that the permit does not cause an unreasonable degradation of the marine environment. In the Fact Sheet on the Proposed Permit, EPA acknowledges that offshore fracking is occurring in the Gulf of Mexico, and that the Proposed Permit allows chemicals used in offshore fracking to be dumped into the Gulf.[18] EPA further acknowledges that it lacks data regarding the types and quantities of chemicals used in such practices.[19] EPA further admitted in response to a request under the Freedom of Information Act that it had no records on the effects of the chemicals used in offshore fracking wastewater on the marine environment.[20]

[18] EPA, FACT SHEET AND SUPPLEMENTAL INFORMATION FOR THE PROPOSED REISSUANCE OF THE NPDES GENERAL PERMIT FOR NEW AND EXISTING SOURCES IN THE OFFSHORE SUBCATEGORY OF THE OIL AND GAS EXTRACTION POINT SOURCE CATEGORY FOR THE WESTERN PORTION OF THE OUTER CONTINENTAL SHELF OF THE GULF OF MEXICO (GMG290000) at 24-25, Apr. 17, 2017.
[19] *Id.*
[20] Letter from EPA, Region 6 to Center for Biological Diversity RE: FOIA Request EPA-R9-2017-000778, Feb. 15, 2017.

Nevertheless, the Proposed Permit allows the unlimited discharge of produced wastewater and well stimulation fluids, including the unlimited discharge of chemicals used in offshore fracking and other well stimulation treatments.[21] There are significant data gaps on the impacts of these discharges on the marine environment; and what is known indicates that the discharge of such wastewater is inherently dangerous and causes undue degradation of the ocean environment.

1. The Discharge of Produced Water and Other Wastes Causes an Undue Degradation of the Marine Environment

EPA has not meaningfully analyzed the massive volume of produced water that flows into the Gulf of Mexico from oil and gas operations. Fracking and other new information indicate that produced water may have increased in volume. For example, EPA records reveal that offshore oil and gas platforms in Region 6 discharged *more than 75 billion gallons* of produced water in 2014.[22] The discharge of produced water—a complex pollutant associated with offshore oil productions—is incompatible with the ocean discharge criteria. Such wastewater can contain harmful substances like benzene, arsenic, lead, hexavalent chromium, barium, chloride, sodium, sulfates, and boron, and it also can be radioactive.[23] Produced water itself is potentially harmful to humans, aquatic life, and ecosystems—in fact, a study sponsored by the U.S. Department of Energy demonstrated that oil production yields "environmentally hazardous" produced water.[24]

Produced water contains several chemicals that are toxic to aquatic life. These compounds include dispersed oils, aromatic hydrocarbons and alkylphenols, heavy metals, biocides, corrosion inhibitors, emulsion breakers, coagulants, oxygen scavengers, and naturally occurring radioactive materials.[25] The most common metals in produced water are arsenic, cadmium, copper, chromium, lead, mercury, nickel, and zinc.[26] In addition, produced water can contain substantial amounts of organic material, inorganic salts, small particles, organic acids (e.g., acetic acid and propionic acid), and can have high levels of sulfur and sulphide.[27]

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[21] While the Proposed Permit prohibits the discharge of priority pollutants except in trace amounts in well stimulation fluids, that limitation does not apply when fracking fluids are mixed with produced water. Moreover, a number of the chemicals frequently used in offshore operations are not listed as priority pollutants by EPA, and thus can be discharged in unlimited amounts in well treatment fluids as well. *See* The Center, Troubled Waters: Offshore Fracking's Threat to California's Ocean, Air and Seismic Stability, Sept. 2014, https://www.biologicaldiversity.org/campaigns/offshore_fracking/pdfs/Troubled_Waters.pdf (listing 10 most commonly used fracking chemicals in oil and gas operations in waters off California).

[22] *See* Excel Spreadsheet, Produced Water Discharges for Region 6 in 2014.

[23] *See e.g.*, *Sierra Club, Lone Star Chapter v. Cedar Point Oil Co*., 73 F.3d 546 (5th Cir. 1996); Mall, Amy, Petition for Rulemaking Pursuant to Section 6974(a) of the Resource Conservation and Recovery Act Concerning the Regulation of Wastes Associated with the Exploration, Development, or Production of Crude Oil or Natural Gas or Geothermal Energy at 8 (2010).

[24] C Tsouris, Oak Ridge National Lab., Emerging Applications of Gas Hydrates at 7.

[25] Neff, J., K. Lee, and E. M. DeBlois. 2011. Produced water: overview of composition, fates, and effects. Pp. 3–54 Produced water. Springer.

[26] Bakke, T., J. Klungsøyr, and S. Sanni. 2013. Environmental impacts of produced water and drilling waste discharges from the Norwegian offshore petroleum industry. Marine Environmental Research 92:154–169.

[27] *Id*.

Several compounds in produced water are known to have negative biological effects. Polycyclic aromatic hydrocarbons and alkylphenols, which are abundant in produced water, are potent carcinogens causing DNA damage[28] and can lead to oxidative stress,[29] cardiac function defeats,[30] embryotoxicity in fish,[31] reduction of lysosomal membrane stability in kidney cells,[32] elevated hepatic activity,[33] and neoplasia of fish liver.[34] Other chemicals such as alkyl phenols at concentration found in produce waters have hormone-disrupting effects in fish,[35] can change the lipid composition in hepatic cells of free-living Atlantic cod and haddock,[36] lead to cytotoxicity in liver cells in rainbow trout (*Onchorhynchus mykiss*),[37] disrupt normal larval pigmentation and increase jaw deformities in Atlantic cod, which reduces feeding ability and results in larval mortality.[38]

Chemicals in produced water cause substantial negative and lethal effects under chronic and acute exposure. Studies of chronic exposure of adult sea scallops (*Placopecten magellanicus*) to different types and concentrations of diluted operational drilling fluids, under environmental representative conditions, have found reductions in somatic and reproductive

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[28] Aas, E., T. Baussant, L. Balk, B. Liewenborg, and O. K. Andersen. 2000. PAH metabolites in bile, cytochrome P4501A and DNA adducts as environmental risk parameters for chronic oil exposure: a laboratory experiment with Atlantic cod. Aquatic Toxicology 51:241–258.

[29] Hasselberg, L., S. Meier, and A. Svardal. 2004. Effects of alkylphenols on redox status in first spawning Atlantic cod (Gadus morhua). Aquatic Toxicology 69:95–105; Sturve, J., L. Hasselberg, H. Fälth, M. Celander, and L. Förlin. 2006. Effects of North Sea oil and alkylphenols on biomarker responses in juvenile Atlantic cod (Gadus morhua). Aquatic toxicology 78:S73–S78.

[30] Incardona, J. P., T. K. Collier, and N. L. Scholz. 2004. Defects in cardiac function precede morphological abnormalities in fish embryos exposed to polycyclic aromatic hydrocarbons. Toxicology and applied pharmacology 196:191–205.

[31] Carls, M. G., L. Holland, M. Larsen, T. K. Collier, N. L. Scholz, and J. P. Incardona. 2008. Fish embryos are damaged by dissolved PAHs, not oil particles. Aquatic toxicology 88:121–127.

[32] Holth, T. F., J. Beckius, I. Zorita, M. P. Cajaraville, and K. Hylland. 2011. Assessment of lysosomal membrane stability and peroxisome proliferation in the head kidney of Atlantic cod (Gadus morhua) following long-term exposure to produced water components. Marine environmental research 72:127–134.

[33] Meier, S., H. Craig Morton, G. Nyhammer, B. E. Grøsvik, V. Makhotin, A. Geffen, S. Boitsov, K. A. Kvestad, A. Bohne-Kjersem, A. Goksøyr, A. Folkvord, J. Klungsøyr, and A. Svardal. 2010. Development of Atlantic cod (Gadus morhua) exposed to produced water during early life stages: Effects on embryos, larvae, and juvenile fish. Marine Environmental Research 70:383–394.

[34] Myers, M. S., J. T. Landahl, M. M. Krahn, and B. B. McCain. 1991. Relationships between hepatic neoplasms and related lesions and exposure to toxic chemicals in marine fish from the US West Coast. Environmental Health Perspectives 90:7.

[35] Arukwe, A., T. Celius, B. T. Walther, and A. Goksøyr. 2000. Effects of xenoestrogen treatment on zona radiata protein and vitellogenin expression in Atlantic salmon (Salmo salar). Aquatic toxicology 49:159–170; Arukwe, A., S. W. Kullman, and D. E. Hinton. 2001. Differential biomarker gene and protein expressions in nonylphenol and estradiol-17β treated juvenile rainbow trout (Oncorhynchus mykiss). Comparative Biochemistry and Physiology Part C: Toxicology & Pharmacology 129:1–10; Meier, S., T. E. Andersen, B. Norberg, A. Thorsen, G. L. Taranger, O. S. Kjesbu, R. Dale, H. C. Morton, J. Klungsøyr, and A. Svardal. 2007. Effects of alkylphenols on the reproductive system of Atlantic cod (Gadus morhua). Aquatic Toxicology 81:207–218.

[36] Grøsvik, B. E., S. Meier, B. Liewenborg, G. Nesje, K. Westrheim, M. Fonn, O. S. Kjesbu, H. Skarphéḥinsdóttir, and J. Klungsøyr. 2010. PAH and biomarker measurements in fish from condition monitoring in Norwegian waters in 2005 and 2008. ICES.

[37] Tollefsen, K. E., R. C. Sundt, J. Beyer, S. Meier, and K. Hylland. 2011. Endocrine modulation in Atlantic cod (Gadus morhua L.) exposed to alkylphenols, polyaromatic hydrocarbons, produced water, and dispersed oil. Journal of Toxicology and Environmental Health, Part A 74:529–542; Meier et al. 2010.

[38] Meier et al. 2010.

tissue growth and mortality.[39] For example, chronic intermittent exposure of adult sea scallops to oil-based mud was highly lethal at concentrations as low as 1 mg/L.[40] Oil-based muds are chemically toxic and disrupt the physiological state and nutritional conditions of sea scallops resulting in low growth rate and survival.[41] Similarly, studies of chronic exposure of the blue mussel (*Mytilus edulis,* a common biomarker) to produced water have shown DNA damages within 1 km of the outfalls.[42] However, current methods may not be sensitive enough to detect biological effects beyond few kilometers from the outfall.[43] Thus the idea that produced water impacts are largely localized is still unverified.

Fish may suffer the highest impacts of produced water since some species are attracted to oil rigs and platforms. For example, samples collected from haddock (*Melanogrammus aeglefinus*) populations in areas with extensive oil and gas production in the North Sea show induction of biotransformation enzymes, oxidative stress, genotoxicity, and altered fatty acid composition.[44] Several studies have shown that fish exposed to alkylphenols and polyaromatic hydrocarbons in produced water alter their endocrine physiology.[45] For example, a study of exposure of different developmental stages of Atlantic cod to several concentrations of produced water collected from an oil platform in the North Sea found that alkylophenols (a chemical known to cause endocrine activity and commonly found in produced water) bioaccumulate in tissue.[46] Concentration of produced water of 1 percent disrupts normal larval pigmentation, reduces feeding by deforming jaw parts in larvae, and leads to mortality.[47]

Alkylophenols have also endocrine effects and disrupt several reproductive parameters in fish, such as reduction of gonadal development,[48] induction of plasma vitellogenin in males and juveniles,[49] and prevention of spermatogenesis and oogenesis.[50] Serious reproductive disturbance has been demonstrated in first-time spawning Atlantic cod.[51] For example, acute exposure (1 to 5 weeks) of Atlantic cod to alkylophenols (via food) resulted in impaired oocyte development,

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[39] Cranford, P. J., D. C. Gordon Jr, K. Lee, S. L. Armsworthy, and G.-H. Tremblay. 1999. Chronic toxicity and physical disturbance effects of water-and oil-based drilling fluids and some major constituents on adult sea scallops (Placopecten magellanicus). Marine Environmental Research 48:225–256.
[40] *Id.*
[41] *Id.*
[42] Brooks, S., C. Harman, B. Zaldibar, U. Izagirre, T. Glette, and I. Marigómez. 2011. Integrated biomarker assessment of the effects exerted by treated produced water from an onshore natural gas processing plant in the North Sea on the mussel Mytilus edulis. Marine pollution bulletin 62:327–339.
[43] Bakke et al. 2013.
[44] Balk
[45] Tollefsen, et al. 2011.
[46] Meier et al. 2010.
[47] *Id*.
[48] Meier et al. 2007.
[49] White, R., S. Jobling, S. A. Hoare, J. P. Sumpter, and M. G. Parker. 1994. Environmentally persistent alkylphenolic compounds are estrogenic. Endocrinology 135:175–182.
[50] Weber, L. P., R. L. Hill, and D. M. Janz. 2003. Developmental estrogenic exposure in zebrafish (Danio rerio): II. Histological evaluation of gametogenesis and organ toxicity. Aquatic toxicology 63:431–446; Weber, L. P., Y. Kiparissis, G. S. Hwang, A. J. Niimi, D. M. Janz, and C. D. Metcalfe. 2002. Increased cellular apoptosis after chronic aqueous exposure to nonylphenol and quercetin in adult medaka (Oryzias latipes). Comparative Biochemistry and Physiology Part C: Toxicology & Pharmacology 131:51–59.
[51] Meier et al. 2007.

reduction of estrogen levels, and substantial delay of spawning in females.[52] Males showed reduction of testosterone and impairment of testicular development.[53] Similarly, chronic exposure (e.g., over 14 weeks) of Atlantic cod to relative low doses of alkylophenols have led to similar results.[54] Other studies of chronic exposure (12 weeks) of Atlantic cod to produced water with concentrations as low as 0.066 - 0.2 percent have shown impair oocyte development and reduce estrogen levels in pre-spawning females, and altered testicular development and reduction of sperm amount in males.[55] These endocrine disruptions occur at concentration found in plumes of produced water and chemical compounds present in produced water are likely to have stronger effects on fish closer to oil platforms.[56]

All these studies show that exposure to produced water can cause a wide range of negative effects in fish and invertebrates. Several of the responses to produced water exposure suggest substantial impacts such as loss of cell membrane integrity, gene expression changes, cytotoxicity, DNA damage, hepatic lipid composition, and reproductive disruption. Based on these studies chronic exposure to even low concentrations of produced water has negative consequences for the physiology of fish and invertebrates. Population and community effects are mostly unknown, as are the cumulative effects of chronic and acute produce water exposure are also unknown.[57]

i. Fate of Produced Water and Habitat Degradation

Produced water undergoes several changes following discharge to the ocean including, dilution, biodegradation, adsorption, evaporation, and photooxidation (Fig. 1).[58] These transformation processes may produce other chemicals that are more bioavailable and toxic for marine organisms than the original chemicals. The rate of biodegradation of chemicals in produced water is thought to be variable and mostly unknown but it depends on the persistence of the chemicals in the water column.[59]

[52] *Id*.
[53] *Id*.
[54] Meier et al. 2011.
[55] Sundt, R. C., and C. Björkblom. 2011. Effects of produced water on reproductive parameters in prespawning Atlantic cod (Gadus morhua). Journal of Toxicology and Environmental Health, Part A 74:543–554.
[56] Bakke et al. 2013.
[57] Bakke et al. 2013.
[58] Neff 2002.
[59] *Id*.

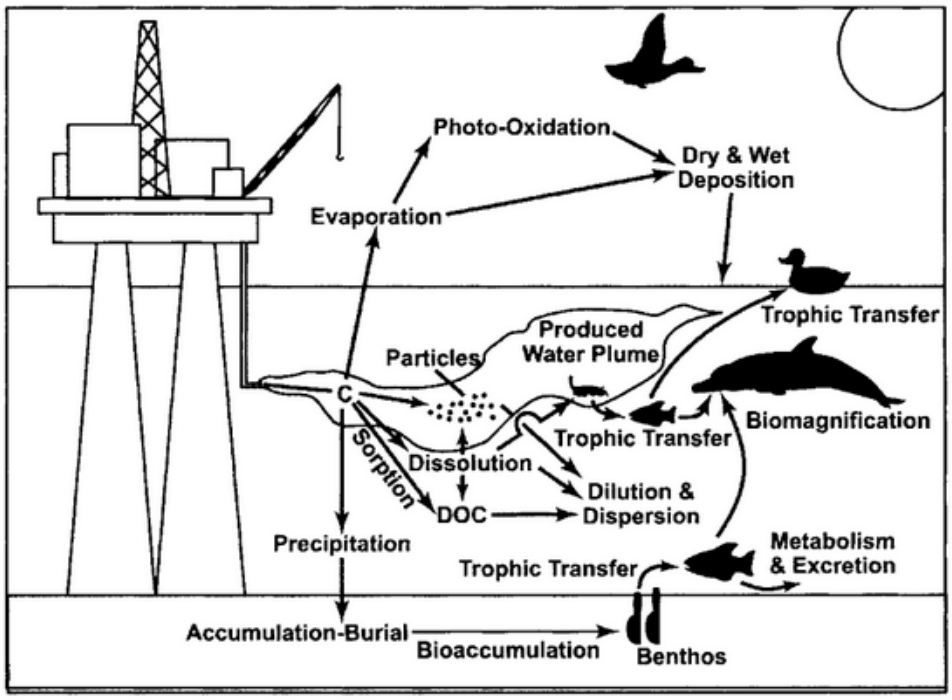

Figure 1. Environmental fates of inorganic and organic chemicals (C) from produced water in seawater following the discharge of treated produced water to the ocean. *Figure and legend after Neff (2002).*

Habitat degradation due to produced water is high near outfalls. Most produced water contain relatively high concentration of several metals compared with clean sea water, with barium, iron, and manganese being the most abundant.[60] These metals tend to rapidly precipitate from the plume, forming barium sulfate and oxides of iron and manganese on sediment surfaces over large areas around the produced water discharges. Evidence suggests that effects of discharges of produced water in the water column and on the seabed in general have higher impacts within 1 or 2 km from the outfall sources.[61] However, the published literature has not yet been able to demonstrate with high confidence that the effects of produced water are only local. Studies have shown that benthic communities require at least 5-10 years to recover from wastes accumulated on the seabed from produced water.[62]

ii. Plume Size of Produced Water

The plume size of produced water is directly related to dilution rates. Dilution rates and potential biological effects of produced water following discharge to the ocean depends on several factors including discharge temperature, density of produced water, current speed, mixing regime, depth of the outfall, water column stratification, and seasonal environmental conditions.[63] For example, produced water can dilute quickly upon discharge in well-mixed marine waters.[64] In general, modeling studies of dispersion of produced water show a rapid

[60] Neff 2002.
[61] Bakke et al. 2013.
[62] Bakke, T., A. M. V. Green, and P. E. Iversen. 2011. Offshore Environmental Effects Monitoring in Norway–Regulations, Results and Developments. Pages 481–491Produced Water. Springer; Bakke et al. 2013.
[63] Neff 2002.
[64] *Id*.

initial dilution (e.g., 30 to 100 fold) within tens of meters of the outfall and slower dilution with distance.[65] Modeled dilutions of produced water discharged to the Gulf of Mexico vary greatly depending on discharge rate and current speed.[66] Plume dilution generally slows down during slack currents and increases during strong currents.

Some produced water is highly buoyant and the plume trends to spread as a thin layer of one or two meters thick on the ocean surface with limited vertical or lateral dispersion in very calm waters. In contrast, under high current and high winds the concentration of the produced water plumes are highly variable and shows variable concentration within the plume. However, it is safe to say that marine organisms close to discharge points are exposed to the highest chemical concentrations.[67] However, most studies today do not have the require sensitivity to detect impacts of produced water at very low concentrations.

These studies demonstrate that there are many unknowns regarding the impacts of the discharge of produced water on the marine environment, including on marine species, but what is known indicates that produced water substantially degrade the marine environment. EPA therefore cannot make the non-degradation finding for produced water. As explained further below, available technologies exist that allow for zero discharge of such wastes and other permits require zero discharge of produced water. EPA should mandate such a limit for the Western Gulf of Mexico.

2. The Discharge of Chemicals Used in Offshore Fracking and Other Well Stimulation Causes an Undue Degradation of the Marine Environment

EPA acknowledges that offshore fracking and other well stimulation treatments occur in the Gulf of Mexico.[68] There are significant data gaps regarding the impacts of offshore fracking and acidization on the marine environment, and the best available scientific information indicates that the discharge of well treatment chemicals does not meet the ocean discharge criteria. Therefore, EPA cannot permit the discharge of fracking and other well stimulation chemicals.

EPA cannot make a valid finding that the permit does not cause an unreasonable degradation of the marine environment because "insufficient information exists" regarding the impacts of well stimulation chemicals "to make a reasonable judgment" that the discharge satisfies all of the ocean discharge criteria.[69] For example, an independent scientific review of offshore well stimulation by the California Council on Science and Technology found significant data gaps on basic questions regarding offshore fracking and acidizing. Among these data gaps, the study found inadequate reporting of well stimulation events, the composition of well stimulation fluid, and toxicity data for common chemicals in fracking and acidizing fluids. In fact, the review found that "no studies have been conducted on the toxicity and impacts of well

[65] Brandsma, M. G., and J. P. Smith. 1996. Dispersion modeling perspectives on the environmental fate of produced water discharges. Pages 215–224Produced Water 2. Springer; Washburn, L., S. Stone, and S. MacIntyre. 1999. Dispersion of produced water in a coastal environment and its biological implications. Continental Shelf Research 19:57–78.
[66] Brandsma and Smith 1996.
[67] Bakke et al. 2013.
[68] Fact Sheet at 24-25.
[69] *See* 33 U.S.C. § 1343(c)(2).

stimulation fluids discharged in federal waters to the marine environment."[70] And, in discussing the impacts of the discharge of fracking chemicals into the ocean, the Bureau of Ocean Energy Management has previously noted that "[t]he lack of toxicity data for 31 of the 48 distinct chemicals was identified as a problem…, as was the lack of available data on chronic impacts of these chemicals in the marine environment…these issues [are] critical data gaps in the analysis of potential impacts of offshore discharges of WST waste fluids to sensitive marine species."[71]

What is known about the chemicals used in of offshore fracking and acidizing indicates that the Proposed Permit does not meet the ocean discharge criteria.[72] Harmful chemicals present in these fluids can include volatile organic compounds, such as benzene, toluene, xylenes, and acetone.[73] A Congressional Report sampling incomplete industry self-reports found that "[t]he oil and gas service companies used fracking products containing 29 chemicals that are (1) known or possible human carcinogens, (2) regulated under the Safe Drinking Water Act for their risks to human health, or (3) listed as hazardous air pollutants under the Clean Air Act."[74] One peer-reviewed scientific study examined a list of 944 fracking fluid products containing 632 chemicals, 353 of which could be identified with Chemical Abstract Service numbers.[75] The study concluded that more than 75 percent of the chemicals could affect the skin, eyes, and other sensory organs, and the respiratory and gastrointestinal systems; approximately 40 to 50 percent could affect the brain/nervous system, immune, and cardiovascular systems, and the kidneys; 37 percent could affect the endocrine system; and 25 percent could cause cancer and mutations.[76]

Another study reviewed exposures to fracking chemicals from onshore wells and noted that trimethylbenzenes are among the largest contributors to non-cancer threats for people living within a half mile of a well, while benzene is the largest contributor to cumulative cancer risk for people, regardless of the distance from the wells.[77] Another recent study has found increased arsenic and heavy metals in groundwater near fracking sites in Texas.[78] Moreover, researchers found greater hormone-disrupting properties in water located near hydraulic fracturing drilling sites than in areas without drilling, and they found that 11 chemicals commonly used for fracking are endocrine disruptors.[79] Recent science on fracking shows that birth defects are more common

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[70] *Id.*
[71] Bureau of Ocean Energy Management, Draft EA on Well Stimulation on the Pacific OCS at 4-35.
[72] *See, e.g.*, United States House of Representatives, Committee on Energy and Commerce Minority Staff, Chemicals used in hydraulic fracturing ("House Report") at 11-12 (2011); Colborn, Theo et al., Natural Gas Operations for a Public Health Perspective, 17 Human and Ecological Risk Assessment 1039 (2011) ("Colborn 2011") at 1039; McKenzie, Lisa et al., Human health risk assessment of air emissions form development of unconventional natural gas resources, Sci. Total Environ. (2012) ("McKenzie 2012").
[73] United States Environmental Protection Agency, *Plan to Study the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources* (2011).
[74] House Report at 8.
[75] Colborn 2011 at 1.
[76] *Id*.
[77] McKenzie 2012 at 5.
[78] Fontenot, Brian E et al., An evaluation of water quality in private drinking water wells near natural gas extraction sites in the Barnett Shale Formation. Environmental Science & Technology (2013) ("Fontenot 2013"); U.S. GAO, *Information on Shale Resources, Development, and Environmental and Public Health Risks* (2012).
[79] Kassotis, Christopher D., et al. Estrogen and Androgen Receptor Activities of Hydraulic Fracturing Chemicals and Surface and Ground Water in a Drilling-Dense Region. Endocrinology, doi 10.1210/en.2013-1697 (2013).

in babies born to mothers living near fracked wells, according to researchers at the Colorado School of Public Health.[80]

The chemicals used in offshore fracking are alarming. An analysis of chemicals used in 12 wells in the Pacific Ocean and disclosed by the voluntary reporting site FracFocus reveals that almost all of the chemicals used are suspected of causing gastrointestinal, respiratory, and liver hazards, as well as skin, eye, and sensory organ risks. More than half of the chemicals are suspected of being hazardous to the kidneys, immune and cardiovascular systems, and more than one third are suspected of affecting the developmental and nervous systems. Between one-third and one-half of the chemicals used are suspected ecological hazards.[81] For example, the chemical X-Cide used often in fracking operations is a hazardous substance under the Occupational Safety and Health Act and the Comprehensive Environmental Response, Cleanup, and Liability Act. According to its Material Safety Data Sheet, the product is hazardous to both fish and wildlife.

Seven Harmful Chemicals used in 12 California Offshore Wells		
Chemical	**Number of Wells Used**	**Known Health Effects**
Crystalline Silica (X-Cide)	All 12 wells	Harmful to skin, eyes and other sensory organs, respiratory system, immune system and kidneys; mutagen. Known human carcinogen.
Methanol	All 12 wells	Harmful to skin, eyes and other sensory organs, respiratory system, gastrointestinal system and liver, brain and nervous system, immune system, kidneys, reproductive and cardiovascular system; mutagen, developmental inhibitor and endocrine disruptor. Ecological risks.
Glyoxal	11 wells	Harmful to skin, eyes and other sensory organs, respiratory and reproductive system, gastrointestinal system and liver, brain and nervous system, immune system, cardiovascular system and blood, endocrine disruptor; mutagen, promoter of cancer. Ecological risks.
Sodium Tetraborate	All 12 wells	Harmful to skin, eyes and other sensory organs, respiratory system, gastrointestinal system and liver, brain and nervous system, kidneys, cardiovascular system. Ecological risks.
2-Butoxyethanol	3 wells	Harmful to skin, eyes and other sensory organs, respiratory system, gastrointestinal system and liver, brain and nervous system, immune system, kidneys, reproductive system and cardiovascular system; mutagen, developmental inhibitor and endocrine disruptor; linked to liver cancer. Also linked to adrenal tumors. Ecological risks.[1]
Merhyl-4-isothiazolin	All 12 wells	Harmful to skin, eyes and other sensory organs, respiratory, reproductive system, brain and nervous system, immune system; mutagen; developmental inhibitor. Ecological risks.
Ethoxylated nonylphenol	9 wells	Harmful to skin, eyes and other sensory organs, respiratory system, gastrointestinal system and liver, immune system, reproductive and cardiovascular system; developmental inhibitor and endocrine disruptor.

Table 1. The Center, Troubled Waters: Offshore Fracking's Threat to California's Ocean, Air and Seismic Stability, Sept. 2014.

[80] McKenzie, Lisa, et al., Birth Outcomes and Maternal Residential Proximity to Natural Gas Development in Rural Colorado, Environmental Health Perspectives (2014).
[81] Colborn 2011.

In addition, scientific research has indicated that 40 percent of the chemicals used in fracking can harm aquatic animals and other wildlife.[82] For example, some of the chemicals used in fracking operations can break down into nonylphenol, a very toxic substance with a wide range of harmful effects that include the development of intersex fish and altered sex ratios at the population level.[83] Nonylphenol can also inhibit the development, growth, and survival of marine invertebrates, and has been shown to bioaccumulate in marine mammal species.[84]

Phenol formaldehyde resins are also used in offshore fracking. These resins are toxic and can cause cancer and mutations; if released into the marine environment, these pollutants have the potential to absorb other chemical compounds such as nonylphenol, increasing their toxicity to marine life.[85] Indeed, chemicals frequently used in offshore fracking are among the most toxic in the entire world with respect to aquatic life.[86]

Additionally, recent studies using fluids produced by fracking to examine their impact on aquatic animals found that the fluids have significant negative effects on rainbow trout, even at greater than 100-fold dilutions.[87] These effects include oxidative stress, endocrine disruption, and biotransformation which may lead to longer term impacts on populations where spills have occurred. A similar study analyzed the impacts of fracking fluids on water fleas, and found exposure to fracking fluids caused a significant decline in reproduction and increased mortality.[88] And another study found acute toxicity of zebrafish embryos from fracking fluid.[89]

Another recent study found that oil companies use dozens of extremely hazardous chemicals to acidize wells. Specifically, the study found that almost 200 different chemicals have been used and that at least 28 of these substances are F-graded hazardous chemicals—carcinogens, mutagens, reproductive toxins, developmental toxins, endocrine disruptors or high acute toxicity chemicals.[90] Each acidization can use as much as hundreds of thousands of pounds

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[82] CCST. 2014. Advanced Well Stimulation Technologies in California: An Independent Review of Scientific and Technical Information. August 28, 2014; The Center, Troubled Waters: Offshore Fracking's Threat to California's Ocean, Air and Seismic Stability, Sept. 2014, https://www.biologicaldiversity.org/campaigns/offshore_fracking/pdfs/Troubled_Waters.pdf.

[83] Diehl, J., et al. 2012. The distribution of 4-nonylphenol in marine organisms of North American Pacific Coast estuaries. Chemosphere 87:490-497.

[84] *Id*.

[85] Mato, Y. et al. 2001. Plastic resin pellets as a transport medium for toxic chemicals in the marine environment. Environmental Science & Technology 35:318-324.

[86] CCST. 2015, Vol. II at 76.

[87] Yuhe He, et al. 2017. Effects on Biotransformation, Oxidative Stress, and Endocrine Disruption in Rainbow Trout (Oncorhynchus mykiss) Exposed to Hydraulic Fracturing Flowback and Produced Water. Environ. Sci. Technol. 2017, 51, 940−947. DOI: 10.1021/acs.est.6b04695; Tamzin A. Blewett, et al. 2017.The effect of hydraulic flowback and produced water on gill morphology, oxidative stress and antioxidant response in rainbow trout (*Oncorhynchus mykiss*), Nature: Scientific Reports. 7:46582. DOI: 10.1038/srep46582.

[88] Tamzin A. Blewett, et al. 2017. Sublethal and Reproductive Effects of Acute and Chronic Exposure to Flowback and Produced Water from Hydraulic Fracturing on the Water Flea Daphnia magna, Environ. Sci. Technol. 2017, 51, 3032−3039. DOI: 10.1021/acs.est.6b05179.

[89] Yuhe He, et al. 2017. Chemical and toxicological characterizations of hydraulic fracturing flowback and produced water. Water Research 114 (2017) 78-87.

[90] Khadeeja Abdullah, Timothy Malloy, Michael K. Stenstrom & I. H. (Mel) Suffet. 2016. Toxicity of acidization fluids used in California oil exploration, Toxicological & Environmental Chemistry.

of some chemicals.[91] Moreover, acid treatments typically have a low pH that is incompatible with water quality criteria and maintenance of existing water quality especially in light of ocean acidification.

3. Existing Permit Conditions Do Not Prevent Undue Degradation

EPA assumes that the conditions in the Proposed Permit are sufficiently protective of the marine environment. But this conclusion is arbitrary—the existing permit conditions do not prevent undue degradation of the marine environment.

In determining no undue degradation, EPA seems to rely on the treatment and toxicity testing for produced water and well treatment fluids required under the Proposed Permit. But treatment of produced water is only oil-water separation, which does not remove any of the chemicals that flow back. It therefore does not prevent the fluids from being dumped into the ocean in the first place. Moreover, toxicity testing is insufficient to ensure that discharges are not toxic because the testing is not frequent enough and not required for all discharge events. For example, the Proposed Permit would only require testing once every six months, and not at the same time as a fracking event.

Moreover, the toxicity requirement that no observable effect concentrations should occur at the edge of the 100-meter mixing zone[92] is arbitrary. Rather, the no observable effect standard should be met at the outfall. Discharges must meet water quality and ocean discharge standards at the point of discharge. Indeed, EPA's no undue degradation determination arbitrarily does not account for impacts inside the mixing zone, whether any mixing zones will overlap, or what the impact of such overlap could be.

Further, while the Proposed Permit prohibits the discharge of priority pollutants except in trace amounts in well stimulation fluids, that limitation does not apply when fracking fluids are mixed with produced water. Moreover, a number of the chemicals frequently used in offshore operations are not listed as priority pollutants by EPA, and thus can be discharged in unlimited amounts in well treatment fluids as well.

In addition, while the inventory requirement that requires reporting of well treatment fluids to EPA with discharge monitoring reports is a step in the right direction, it does not prevent such chemicals from being discharged, and is thus inadequate to protect water quality. It is unclear whether the inventory requirement applies to well treatment fluids that are comingled with produced water. The Proposed Permit states that "[w]hen well treatment, completion or workover fluids are commingled and discharged with produced water, the discharges are considered produced water."[93] This appears to undermine the requirements to inventory and disclose the discharges thus failing to protect water quality when well treatments, such as fracking, result in flow back or otherwise dilute the discharges with produced water.

[91] *Id.*
[92] Fact Sheet at 16, 30.
[93] Proposed Permit at 23.

Similarly, it is generally good to incentivize the industry-wide study and characterization of discharge of well treatment chemicals; but this does not assuage concerns that the discharges should be prohibited until proven safe. And if EPA chooses to allow the discharge of fracking fluids, it should mandate this study in addition to mandating the disclosure of the types and quantities of fracking chemicals used in each frack job, not merely as an alternative to the disclosure requirements.

4. The Permit Should Require Zero Discharge of Drill Cuttings, Drilling Fluids, Well Treatment Fluids, and Produced Water

Given available information indicating that the discharge of water pollution from offshore oil and gas operations degrades the ocean environment, and the significant data gaps regarding the impacts of such discharge, including that of offshore fracking and other well stimulation chemicals, EPA should revise the permit to disallow the discharge of water pollution from oil and gas drilling operations.[94] The receiving waters in the Gulf of Mexico are important habitat for endangered species, fish, and other wildlife. The discharge of pollution will degrade the marine environment.

The Gulf of Mexico is one of the most productive—and fragile—marine ecosystems in the nation. It supports a staggering array of marine life and represents an important contribution to the Gulf coast economy. The Gulf of Mexico is home to thousands of marine species, ranging from simple invertebrates such as gastropods and sponges to complex and highly evolved fish and marine mammals. It is estimated that there are thousands of species of invertebrates, at least 600 species of fish, and dozens of species of cetaceans in the Gulf. In addition, five of the world's eight species of sea turtles as well as tens of thousands of shore and coastal birds reside in or migrate to the Gulf of Mexico. More than 300 species of coral, combined with other hard-bottom communities, wetlands, seagrass beds, mangroves, and soft-bottom communities, provide the necessary habitat to support this rich assemblage of marine life. These diverse and highly complex habitats provide food, shelter, and spawning grounds for all of the Gulf's species at different points during their life history.

Many of the species that are found in the Gulf of Mexico are listed as threatened or endangered under the ESA. The Region is home to endangered sperm whales and endangered West Indian manatees; five threatened and endangered sea turtle species including green, hawksbill, Kemp's ridley, leatherback, and loggerhead turtles; ten bird species including endangered whooping cranes and red-cockaded woodpecker; and three listed fish species—Alabama sturgeon, the Gulf subspecies of Atlantic sturgeon, and smalltooth sawfish.[95] Critical habitat is designated in the Gulf for loggerhead turtles, Gulf sturgeon, smalltooth sawfish, West Indian manatees, and piping plovers.[96] And there are five coral species that are listed as threatened under the ESA—elkhorn, staghorn, lobed star, mountainous star, and boulder star corals.[97]

[94] There could be an exception for emergency discharges.
[95] BOEM, 2017-2022 Outer Continental Shelf Draft Proposed Program at 6-12 (Jan. 2015).
[96] *Id.*
[97] *Id*. at 6-11.

The Gulf of Mexico is also home to many species of marine mammals protected under the Marine Mammal Protection Act, including killer whales, dwarf and pygmy sperm whales, pygmy killer whales, several species of beaked whales, bottlenose dolphins, Atlantic and pantropical spotted dolphins, striped dolphins, Clymene dolphins, Fraser's dolphins, Risso's dolphins, and melon-headed whales.[98]

The Gulf of Mexico is also home to Bryde's whales, where the species exists as a small, resident population. It is the only baleen whale known to be resident to the Gulf. Recent abundance estimates put the population's size at fewer than 50 animals, and they are severely restricted in range, being found only in the northeastern Gulf, more specifically in the waters of the DeSoto Canyon. A recent study by the National Marine Fisheries Service suggests that the population is isolated and evolutionarily distinct from all other Bryde's whales examined to date, indicating that the species may be a distinct subspecies.[99]

The discharge of pollution from offshore oil and gas drilling into this important habitat is unnecessary because a zero discharge permit is feasible. There are already oil and gas operations that meet zero discharge requirements. For example, coastal offshore drilling operations in the Gulf already require zero discharge of produced water and treatment, workover, and completion fluids as well as drilling fluids, drill cuttings, and dewatering effluent.[100] Similarly, the general permit for oil and gas drilling activities on the Beaufort OCS prohibits discharge of drilling fluids at certain times of year and has a no discharge limit in certain locations.[101] If EPA does not implement the restriction as a technology-based effluent limitation, the best management practice ("BMP")—used to address developments for which the effluent limitation guidelines have not kept pace—should mandate the zero discharge requirement.[102]

5. In the Alternative, the Permit Must Place Additional Restrictions on the Discharges to Protect Water Quality

The permit should be for zero discharge; however, if EPA declines to adopt a zero discharge limitation for drilling fluids, produced water, and well treatment fluids then it must include additional limitations to prevent degradation of water quality. Specifically the permit should (1) limit the volume of produced water to be discharged; (2) prohibit the discharge of well treatment fluids, including fracking chemicals; (3) require enhanced monitoring; and (4) if well treatment fluids are still permitted to be discharged or comingled with produced water there should be a non-detect limit on priority pollutants and chemicals classified as hazardous at the discharge point.

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[98] NOAA, Cetacean Data Availability, http://cetsound noaa.gov/cda.
[99] NRDC, *Petition to list the Gulf of Mexico Bryde's whale* (Balaenoptera edeni) *as endangered under the Endangered Species Act*, Sept. 2014, *available at* http://docs.nrdc.org/wildlife/files/wil_14091701a.pdf.
[100] 61 Fed. Reg. 66,086, 66,088 (December, 16, 1996) (Final Effluent Limitations Guidelines and Standards for the Coastal Subcategory of the Oil and Gas Extraction Point Source Category).
[101] EPA, AUTHORIZATION TO DISCHARGE UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) FOR OIL AND GAS EXPLORATION FACILITIES ON THE OUTER CONTINENTAL SHELF AND CONTIGUOUS STATE WATERS IN THE BEAUFORT SEA, Permit No.: AKG-28-2100, Oct. 23, 2012.
[102] *See* 40 C.F.R. § 122.44(k).

First, EPA must place a numeric volume limit for produced water allowed to be discharged. As explained above, produced water degrades water quality and introduces toxins into the marine environment. Well treatment activities may increase produced water discharges and extend the life of oil and gas operations; without a limit on produced water volume it is impossible for EPA to guarantee against the degradation of the marine environment and water quality. Already the amount of produced water that is discharged into the Gulf of Mexico is harmful, and the quantity could increase with new leases and changes in drilling and well stimulation practices. The proposed permit is more lax than other OCS General Permits, and it is therefore arbitrary and inconsistent with other EPA General Permits. For example, in the Pacific OCS general permit, EPA Region 9 set a limit of volume of produced water allowed for each platform.[103]

Second, EPA should require zero discharge of well treatment fluids, and well treatment fluids comingled with produced water. Under the permit, EPA considers chemicals used in offshore fracking to be well treatment fluids. Well treatment fluids contain toxic chemicals that are harmful for aquatic animals and water quality. Well treatment uses chemicals for a variety of functions, such as: dissolving acids, biocides, breakers, clay stabilizers, corrosion inhibitors, crosslinkers, foamers and defoamers, friction reducers, gellants, pH controllers, proppants, scale controllers, and surfactants. And, as explained above, modern fracking uses hundreds of chemicals that cause cancer or damage to the nervous, cardiovasculatory, and endocrine systems; and can be incredibly toxic to fish and other marine life.[104]

Third, EPA should also require monitoring and reporting for additional chemicals in all types of discharges. For example, the Pacific OCS permit requires monitoring for specific chemicals, such as benzene, in produced water for each platform, for certain chemicals it also prescribes discharge limits.[105] Here, given the new information about produced water and its potential toxicity, EPA should require more robust monitoring for chemicals that could degrade the marine environment.

Fourth, while discharges of well treatment fluids should be completely prohibited, if EPA nonetheless decides to allow such discharges, it must place numeric limits on the toxic chemicals that occur in well treatment fluids that apply at the point of discharge and require robust monitoring to ensure compliance. In addition to limits, EPA should identify biologically sensitive areas or seasons to require zero discharge to protect sensitive species. For example, EPA should restrict discharges in sea turtle critical habitat and Desoto Canyon. This would be more consistent with other EPA permits. For example, the Beaufort OCS General Permit prohibits discharge of drilling fluids during bowhead whaling activities and has a no discharge limit near the Boulder Patch.[106]

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[103] EPA, Reissuance of National Pollutant Discharge Elimination System (NPDES) General Permit for Offshore Oil and Gas Exploration, Development and Production Operations Off Southern California, 79 Fed. Reg. 1,643 (Jan 23, 2014) at 9.
[104] Colborn 2011.
[105] *Supra* n. 103.
[106] EPA, AUTHORIZATION TO DISCHARGE UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) FOR OIL AND GAS EXPLORATION FACILITIES ON THE OUTER CONTINENTAL SHELF AND CONTIGUOUS STATE WATERS IN THE BEAUFORT SEA, Permit No.: AKG-28-2100, Oct. 23, 2012.

Finally, EPA should require coverage under an individual NPDES permit rather than coverage under the proposed general NPDES permit for any facility that intends to discharge drilling wastes, including produced water and well stimulation fluids, landward of the 200-meter isobath. EPA's Region 4, with jurisdiction over discharges in the Eastern Gulf of Mexico, recently proposed to require facilities seaward of the 200-meter isobaths to obtain coverage under an individual permit.[107] This will enable permit conditions to be specifically tailored to the types and quantities of wastes the individual facility intends to discharge, in an effort to better protect water quality.

II. Issuance of the Permit Requires Preparation of an Environmental Impact Statement under the National Environmental Policy Act

EPA's issuance of the Proposed Permit requires an environmental impact statement ("EIS") under the National Environmental Policy Act ("NEPA"). NEPA, America's "basic national charter for protection of the environment,"[108] requires federal agencies to take a "hard look" at the environmental consequences of their actions before taking action.[109] In this way, NEPA ensures that federal agencies "will have available, and will carefully consider, detailed information concerning significant environmental impacts" and that such information "will be made available to the larger [public] audience that may play a role in both the decisionmaking process and the implementation of the decision."[110]

To that end, NEPA requires federal agencies to prepare an EIS for all "major Federal actions significantly affecting the quality of the human environment."[111] NEPA's implementing regulations define "major federal action" to include the "[a]pproval of specific projects, such as construction or management activities located in a defined geographic area" and specify that "[p]rojects include actions approved by permit."[112]

NEPA's implementing regulations also specify factors that must be considered in determining when a major federal action may significantly affect the environment warranting the preparation of an EIS.[113] Specifically, in determining whether an action may have "significant" impacts on the environment, an agency must consider the "context" and "intensity" of the action.[114] "Context" means the significance of the project "must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality."[115]

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[107] EPA, Draft National Pollutant Discharge Elimination System (NPDES) General Permit No. GEG460000 For Offshore Oil and Gas Activities in the Eastern Gulf of Mexico, Apr. 2017.
[108] 40 C.F.R. § 1500.1(a).
[109] *Kleppe v. Sierra Club*, 427 U.S. 390, 410, n. 21 (1976); 40 C.F.R. § 1500.1(a).
[110] *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349 (1989).
[111] 42 U.S.C. § 4332(2)(C).
[112] 40 C.F.R. § 1508.18.
[113] *See id.* § 1508.27(b).
[114] *Id*. § 1508.27.
[115] *Id*. § 1508.27(a).

The intensity of the action is determined by considering the ten factors enumerated in the regulations, which include: (1) impacts that may be both beneficial and adverse; (2) the degree to which the proposed action affects public health or safety; (3) unique characteristics of the geographic area such as proximity to ecologically critical areas; (4) the degree to which the effects on the human environment are likely to be highly controversial; (5) the degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks; (6) the degree to which the action may establish a precedent for future actions with significant effects; (7) whether the action is related to other actions with individually insignificant but cumulatively significant impacts; (8) the degree to which the action may cause loss or destruction of significant scientific, cultural, or historical resources; (9) the degree to which the action may adversely affect a species listed under the ESA or its critical habitat; and (10) whether the action threatens a violation of federal, state or local environmental laws.[116]

The presence of even just "one of these factors may be sufficient to require preparation of an EIS in appropriate circumstances."[117] If "substantial questions as to whether a project . . . may cause significant degradation of some human environmental factor," an EIS must be prepared.[118] Accordingly, in order for a court to find that an EIS is warranted, "a plaintiff need not show that significant effects will in fact occur" only that there are "substantial questions whether a project may have a significant effect on the environment."[119]

NEPA regulations dictate that "[i]t is only when the proposed action '*will not* have a significant effect on the human environment,' that an EIS is not required."[120] Wherever a question exists as to whether an EIS is required, an agency must ordinarily at least prepare an environmental assessment ("EA"), which is used to determine whether the environmental effects of the action are "significant" and therefore require the preparation of an EIS.[121] An EA is "a concise public document that briefly provides evidence and analysis for determining whether to prepare an EIS or a finding of no significant impact."[122]

Here, several significance factors are raised, clearly necessitating the preparation of an EIS. In particular, the Proposed Permit—which allows the unlimited discharge of produced wastewater and well stimulation fluids into the Gulf of Mexico—impacts a geographically, ecologically, culturally important areas; may have adverse environmental impacts, including impacts to ESA-listed species and their critical habitat; represents a substantial public controversy; has unique or unknown risks; and threatens a violation of the CWA. At the very least, EPA must prepare an EA.

A. The Proposed Permit Affects Geographically and Culturally Unique Areas

As explained above, the Gulf of Mexico is one of the most productive—and fragile—

[116] *Id.* § 1508.27(b)(1)-(10).
[117] *Ocean Advocates v. U.S. Army Corps of Eng'rs*, 402 F.3d 846, 865 (9th Cir. 2005).
[118] *Idaho Sporting Congress v. Thomas*, 137 F.3d 1146, 1149 (9th Cir. 1998).
[119] *Nat. Resource Defense Council v. Winter*, 502 F.3d 859, 867 (9th Cir. 2007) (citations omitted).
[120] *National Audubon Soc. v. Hoffman*, 132 F.3d 7, 13 (2nd Cir. 1997) (citing 40 C.F.R. § 1508.13, emphasis by court).
[121] 40 C.F.R. § 1501.4.
[122] *Id.* at § 1508.9.

marine ecosystems in the nation. Hundreds of types of fish and shellfish inhabit the Mississippi Delta and Gulf of Mexico, many of which support fisheries. The warm waters are home to a vast array of wildlife and habitats, including many sensitive animals that are threatened by offshore drilling. There are five species of ESA-listed sea turtles and important nesting beaches dotting the coast; and there are five species of ESA-listed corals. Whales and dolphins live in the Gulf, which includes core habitat for endangered sperm whales. There are 3 million acres of wetlands with breeding, foraging and migratory habitat for more than 400 types of birds. These habitats and animals are being degraded and harmed by waste discharge from drilling operations, and some fish and shellfish may accumulate toxins that eventually wind up on our plates. Many other species in the Gulf of Mexico are listed as threatened or endangered under the ESA.

As also explained above, produced wastewater and well stimulation chemicals can have several negative impacts due to the dangerous chemicals present in such discharges. Moreover, EPA's Proposed Permit allows oil companies to discharge produced water and well stimulation fluids, including chemicals used in offshore fracking and acidizing, which can also affect geographically and culturally unique areas in the Gulf. An EIS is therefore required.

B. The Proposed Permit May Have Adverse Impacts and May Impact ESA-Listed Species

EPA's Proposed Permit allows oil companies to discharge unlimited quantities of produced water, and allows the chemicals used in fracking and other well stimulation treatments to be discharged into the Gulf of Mexico. EPA must prepare an EIS because the discharge of produced water, including the discharge of chemicals used in offshore fracking and acidizing, have adverse impacts, and may impact ESA-listed species and their critical habitat.[123] While substantial data gaps exist regarding the impacts of these practices, what is known is cause for great alarm.

As explained above, scientific research indicates that produced wastewater may have substantial environmental impacts. Scientific research also indicates that 40 percent of the chemicals used in fracking can harm aquatic animals and other wildlife.[124] By example, some chemicals used in fracking operations can break down into nonylphenol, a very toxic substance with a wide range of harmful effects including the development of intersex fish and altered sex ratios at the population level.[125] Nonylphenol can also inhibit development, growth, and survival of marine invertebrates, and has been shown to bioaccumulate in marine mammal species.[126]

Contamination incidents have occurred that demonstrate that impacts to ESA-listed fish in the Gulf and wildlife harm is a real impact that must be considered. For example, in 2013, a company admitted to dumping wastewater from fracking operations into the Acorn Fork Creek

[123] 40 C.F.R. § 1508.27(b)(1), (9).
[124] CCST. 2014. Advanced Well Stimulation Technologies in California: An Independent Review of Scientific and Technical Information. August 28, 2014; The Center, Troubled Waters: Offshore Fracking's Threat to California's Ocean, Air and Seismic Stability, Sept. 2014, https://www.biologicaldiversity.org/campaigns/offshore_fracking/pdfs/Troubled_Waters.pdf.
[125] Diehl, J., et al. 2012. The distribution of 4-nonylphenol in marine organisms of North American Pacific Coast estuaries. Chemosphere 87:490-497.
[126] *Id*.

in Kentucky, causing a massive fish kill.[127] In fact, "the discharges killed virtually all aquatic wildlife in a significant portion of the fork, including fish and invertebrates."[128] According to scientists, the abrupt and persistent changes in post-fracking water quality resulted in toxic conditions.[129] Among the species harmed was the blackside dace, a threatened minnow species.[130] The discharge of fracking wastewater into the Susquehanna River in Pennsylvania is suspected to be the cause of fish abnormalities, including high rates of spots, lesions, and intersex.[131] Several spills of fracking fluid from pipelines in Pennsylvania over the last few years also resulted in significant fish kills.[132] Such contamination incidents are a real risk in the Gulf of Mexico given EPA's Proposed Permit that would allow oil companies to dump fracking chemicals into the Gulf. EPA must therefore prepare an EIS.

C. The Proposed Permit Represents a Substantial Public Controversy

EPA must prepare an EIS because the Proposed Permit would allow oil companies to dump offshore fracking wastewater directly into the Gulf of Mexico, which constitutes a substantial public controversy. In determining whether an action is significant, CEQ regulations also require an agency to consider "[t]he degree to which the effects. . . are likely to be highly controversial."[133] "Controversial" is "a substantial dispute [about] the size, nature or effect of the major Federal action."[134] A substantial dispute exists when evidence, raised prior to the preparation of an EIS or Finding of No Significant Impact casts serious doubt upon the reasonableness of an agency's conclusions.[135] "[A]n outpouring of public protest" has been held to satisfy the requirement of "substantial dispute."[136]

There as certainly been an "outpouring of public protest" about offshore fracking, including the dumping of fracking chemicals into the ocean. For example, when the public first learned that oil companies were fracking off the West Coast, demonstrations were held where the public protested offshore fracking and the federal government's approval of the practice.[137] And

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[127] Vaidyanathan, Gayathri, Fracking Spills Cause Massive Ky. Fish Kill, E&E News, Aug. 29. 2013, http://www.eenews net/greenwire/2013/08/29/stories/1059986559.
[128] U.S. Fish and Wildlife Service, Office of Law Enforcement, Case at a Glance: U.S. v. Nami Resources Company, LLC, www fws.gov/home/feature/2009/pdf/NamiInvestigation.pdf.
[129] Jennifer Dloughy, Study documents fish kill from hydraulic fracturing fluid, Fuel Fix, Aug. 28, 2013, referencing and citing Papoulias, D.M. and A.L. Velasco. (2013). Histopathological analysis of fish from Acorn Fork Creek, Kentucky, exposed to hydraulic fracturing fluid releases. Southwestern Naturalist 12 (Special Issue 4): 92-111.
[130] *Id.*
[131] Piette, Betsy, BP Oil Spill, Fracking Cause Wildlife Abnormalities, Workers World (April 27, 2012) available at http://www.workers.org/2012/us/bp_oil_spill_fracking_0503/; Pennsylvania Fish & Boat Commission, Ongoing Problems with the Susquehanna River smallmouth bass, a Case for Impairment (May 23, 2012), www fish.state.pa.us/newsreleases/2012press/senate_susq/SMB_ConservationIssuesForum_Lycoming.pdf.
[132] MIT Energy Initiative. (2011). "The future of Natural Gas, An Interdisciplinary MIT study." http://web mit.edu/mitei/research/studies/natural-gas-2011.shtml.
[133] 40 C.F.R. § 1508.27(b)(4).
[134] *Blue Mountains Diversity Project v. Blackwood*, 161 F.3d 1208, 1212 (9th Cir. 1998) (citations omitted).
[135] *Protect Our Water v. Flowers*, 377 F. Supp.2d 844, 861 (E.D. Cal. 2004).
[136] *Greenpeace Action v. Franklin,* 14 F.3d 1324, 1334 (9th Cir.1992).
[137] *See e.g.*, Fracking foes plan Coastal Commission rally today in Long Beach, OC Register, Mar. 11, 2014, http://www.ocregister.com/articles/fracking-605193-commission-beach html; Hundreds of Tribal Representatives Join Huge Rally to Oppose Fracking, IC Magazine, Mar. 18, 2014, https://intercontinentalcry.org/hundreds-tribal-representatives-join-huge-rally-oppose-fracking-22513/

a number of conservation organizations sent letters to the Bureau of Ocean Energy Management urging the agency to place a moratorium on offshore fracking and other well stimulation treatments unless and until extensive environmental review was conducted and the practices proven safe.[138] Further, a number of organizations have expressed concern over EPA's NPDES permits for offshore oil and gas operations that allow the dumping of fracking wastewater into the ocean.[139] And there was an outpouring of public protest generated as the result of requests under the Freedom of Information Act revealing the scope of offshore fracking permitted in the Gulf of Mexico and the quantity of produced water EPA allows to be dumped into the Gulf.[140]

Moreover, the oil industry claims offshore fracking has no adverse environmental impacts, while numerous scientists and reports have linked fracking to water contamination, air contamination, spills, and earthquakes.[141] EPA's proposal to allow oil and gas companies to dump fracking wastewater into the Gulf of Mexico clearly constitutes a substantial public controversy. Indeed, it is hard to imagine an issue more fitting of this description than offshore fracking activities. An EIS is therefore required.

D. The Proposed Permit Has Highly Uncertain, Unique, or Unknown Risks

EPA must prepare an EIS because the Proposed Permit involves highly uncertain, unique, or unknown risks.[142] For example, as explained above, an independent scientific review of offshore well stimulation by the California Council on Science and Technology found significant data gaps on basic questions regarding offshore fracking and acidizing.[143] And in discussing the impacts of the discharge of fracking chemicals into the ocean, the Bureau of Ocean Energy Management has previously acknowledged that there are critical data gaps in the analysis of

[138] *See e.g.*, Letter from the Center for Biological Diversity to BOEM and BSEE, Oct. 3, 2013, http://www.biologicaldiversity.org/campaigns/offshore_fracking/pdfs/LetterOnOffshoreFrackingMoratoriumNEPA_2013.pdf; Letter from Environmental Defense Center, et al. to BOEM and BSEE, Dec. 23, 2013, http://documents.coastal.ca.gov/reports/2014/2/W7a-2-2014.pdf, pg. 12.

[139] *See e.g.*, The Center, Legal Petition Urges EPA to Ban Dumping of Offshore Fracking Chemicals Into California's Ocean, Feb. 26, 2014, https://www.biologicaldiversity.org/news/press_releases/2014/fracking-02-26-2014.html.

[140] *See e.g.*, The Center, Obama Administration Permitted 1,200 Offshore Fracks in Gulf of Mexico, June 28, 2016, https://www.biologicaldiversity.org/news/press_releases/2016/offshore-fracking-06-28-2016.html; Mike Ludwig, This Map Shows Where Offshore Fracking Has Occurred in the Gulf of Mexico. TruthOut, June 30, 2026, http://www.truth-out.org/news/item/36643-this-map-shows-where-offshore-fracking-has-occurred-in-the-gulf-of-mexico.

[141] *See e.g.*, Goebel, et al. 2016; Ellen Webb, et al. 2014. Developmental and reproductive effects of chemicals associated with unconventional oil and natural gas operations. Reviews on Environmental Health. Vol. 29, Issue 4, pp. 307–318, ISSN (Online) 2191-0308, ISSN (Print) 0048-7554. doi: 10.1515/reveh-2014-0057; California aquifers contaminated with billions of gallons of fracking wastewater, RT.com, Oct. 2014, https://www rt.com/usa/194620-california-aquifers-fracking-contamination/; Fontenot, Brian E, et al. 2013. An evaluation of water quality in private drinking water wells near natural gas extraction sites in the Barnett Shale Formation. *Environ. Sci. Technol. 47* (17), pp 10032–10040; doi: 10.1021/es4011724.

[142] *See* 40 C.F.R. § 1508.27(b)(5).

[143] California Council on Science and Technology. 2015. An Independent Scientific Assessment of Well Stimulation in California: Volume III. Case Studies of Hydraulic Fracturing and Acid Stimulations in Select Regions: Offshore, Monterey Formation, Los Angeles Basin, and San Joaquin Basin, at 29.

potential impacts of the discharges of fracking chemicals and other well stimulation waste fluids on sensitive marine species.[144]

EPA appears to rely on the lack of information to find that there will not be significant impacts from allowing oil companies to dump fracking and other well stimulation fluids into the Gulf of Mexico. But as the Ninth Circuit has made perfectly clear, "lack of knowledge does not excuse the preparation of an EIS; rather it requires the [agency] to do the necessary work to obtain it."[145] In other words, the substantial data gaps that exist regarding the impacts of offshore fracking and acidizing on the marine environment necessitate the preparation of an EIS.[146]

E. The Proposed Permit Threatens a Violation of a Federal Environmental Law

EPA must also prepare an EIS because the Proposed Permit threatens to violate the CWA—a federal law intended to protect the environment.[147] Under the CWA, EPA can only issue the Proposed Permit if it reasonably finds that the discharge satisfies the ocean discharge criteria and will not cause an undue degradation of the marine environment.[148] But, as explained above, EPA does not have sufficient information to determine that the discharge of produced water and well stimulation fluids, including the discharge of chemicals used in offshore fracking, will not cause an undue degradation of the marine environment. Indeed, the available information indicates just the opposite. EPA must therefore prepare an EIS.

III. EPA's NEPA Analysis Must Take A Hard Look at the Direct, Indirect and Cumulative Impacts from the Proposed Permit,

In conducting an EIS under NEPA, EPA must consider and describe the direct, indirect and cumulative impacts from the Proposed Permit.[149] Direct, indirect, and cumulative impacts are distinct from one another: direct effects are "caused by the action and occur at the same time and place."[150] Indirect effects are caused by the action but, "are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effect on air and water and other natural systems, including ecosystems."[151]

Cumulative impacts are those impacts that "result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative

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[144] Bureau of Ocean Energy Management, Draft EA on Well Stimulation on the Pacific OCS at 4-35.
[145] *Nat'l Parks & Conservation Ass'n v. Babbitt*, 241 F.3d 722, 733 (9th Cir. 2001).
[146] To the extent EPA is relying on past EISs conducted on the issuance of previous iterations of the General Permit to authorize the new permit, that reliance fails to satisfy EPA's duties under NEPA because the EISs fail to consider the impacts of the discharge of chemicals used in fracking and other wells stimulation treatments into the Gulf.
[147] 40 C.F.R § 1508.27(b)(1)-(10).
[148] 40 C.F.R. § 125.123(a); 33 U.S.C. § 1343(a), (c)(2).
[149] *Id.* §§ 1502.16, 1508.7, 1508.8; *Northern Plains Resource Council v. Surface Transportation Board*, 668 F.3d 1067, 1072-73 (9th Cir. 2011).
[150] 40 C.F.R. § 1508.8(a).
[151] *Id.* § 1508.8(b).

impacts can result from individually minor but collectively significant actions taking place over a period of time."[152] EPA's analysis must consider the direct, indirect, and cumulative impact of drilling waste, produced water, and well treatment discharges, including the impacts of discharging chemicals used in offshore fracking and acidizing.

As part of this analysis, EPA must obtain, disclose, and analyze the full scope of offshore fracking and other well stimulation in the Gulf of Mexico. The Bureau of Safety and Environmental Enforcement ("BSEE")—the entity charged with permitting offshore drilling activities in federal waters—should have information on the scope of such activities permitted in the waters within the jurisdiction of Region 6 of EPA. For example, a recent request pursuant to the Freedom of Information Act revealed that BSEE permitted offshore fracking more than 1,600 times at more than 600 wells in the Gulf of Mexico OCS Region.[153] Failure to obtain this information would make it impossible for EPA to comply with the hard look requirements of NEPA.

Fracking and other new information indicate that produced water may have increased volume. EPA records reveal that offshore oil and gas platforms in Region 6 discharged *more than 75 billion gallons* of produced water in 2014.[154] EPA must quantify the amount of produced water permitted to be discharge under the Proposed Permit, including that which occurs from drilling on the Western Gulf of Mexico OCS as well as the produced water that is allowed to be discharged in the Western Gulf from operations in state waters.

In its EIS, EPA must also "rigorously explore" and "objectively evaluate" all reasonable alternatives to issuing the Proposed Permit.[155] EPA must consider several alternatives that would better protect the marine environment from the dangerous discharges associated with offshore oil and gas activities, and better comply with EPA's duties under the CWA. For example, EPA must consider:

(1) an alternative that would prohibit the discharge of all produced wastewater, well treatment and completion fluids, and other drilling wastes (i.e., a "zero-discharge" standard), such as is currently required of coastal offshore drilling operations in the Gulf;[156]
(2) an alternative that would prohibit the discharge of chemicals used in offshore fracking and other well stimulation treatments into the Western Gulf of Mexico;
(3) an alternative that would require oil companies intending to use offshore fracking or other well stimulation treatments to get an individual permit, rather than being eligible for coverage under the Proposed Permit;
(4) an alternative that would require oil companies to provide advance notice of their use of well stimulation to the public and require public disclosure of the chemicals used in well stimulation treatments;

[152] *Id.* § 1508.7.
[153] Letters from Bureau of Safety and Environmental Enforcement, Gulf of Mexico OCS Region to Center for Biological Diversity, Re: FOIA Request No 2015-00019, Apr.– June 2016.
[154] *See* Excel Spreadsheet, Produced Water Discharges for Region 6 in 2014.
[155] 40 C.F.R. § 1502.14.
[156] 61 Fed. Reg. at 66,088.

(5) an alternative that would place the burden on the oil companies to prove a chemical is ecologically safe before being permitted to use and discharge it;
(6) an alternative that would require monitoring or WET testing of effluent when discharging chemicals used in fracking or other well stimulation treatments, and continued testing for a certain amount of time after the discharge;
(7) an alternative that would implement a zero-discharge requirement in certain ecologically sensitive areas; and
(8) an alternative that would require facilities landward of the 200-meter isobath to obtain coverage under an individual permit

To the extent EPA is relying on past NEPA analysis to authorize the Proposed Permit, that reliance is improper. NEPA requires agencies to supplement their NEPA analyses when "[t]he agency makes substantial changes in the proposed action that are relevant to environmental concerns; or [t]here are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts."[157]

New information demonstrates that the use of fracking has increased dramatically in recent years, and this trend is expected to continue. Indeed, according to a representative of Baker Hughes (which operates about one-third of the world's offshore fracking fleet), fracking in the Gulf of Mexico is expected to increase due to the fact that the industry is now targeting increasingly deeper wells in the Gulf.[158] Moreover, EPA is now authorizing "brine and water-based mud discharges at the seafloor for temporary well abandonment" as "miscellaneous discharges" for the first time, which could have impacts on benthic communities and other wildlife for the reasons described above. This information, coupled with the new information above regarding the impacts of produced water and the chemicals used in offshore fracking on wildlife and the marine environment clearly trigger EPA's duty to supplement its prior analysis. Similarly, to the extent EPA is relying on the EIS conducted by the Bureau of Ocean Energy Management on the Five-Year Offshore Oil and Gas Leasing Program, that reliance is also improper because that document does not take a hard look at the direct, indirect, and cumulative impacts of the Proposed Permit or examine alternatives to the Proposed Permit.

IV. EPA Must Comply with its Consultation Obligations Under the Endangered Species Act Prior to Approving the Proposed Permit

Approval of the Proposed Permit would also require consultation under Section 7 of the ESA prior to its issuance. In enacting the ESA, Congress recognized that certain species "have been so depleted in numbers that they are in danger of or threatened with extinction."[159] Accordingly, a primary purpose of the ESA is "to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, [and] to provide a program for the conservation of such . . . species."[160]

[157] 40 C.F.R. § 1502.9(c)(1)(i), (ii).
[158] David Wethe, Bloomberg News, *Deep Water Fracking Next Frontier for Offshore Drilling*, Aug. 27, 2014, http://www.bloomberg.com/news/articles/2014-08-07/deep-water-fracking-next-frontier-for-offshore-drilling.
[159] 16 U.S.C. § 1531(a)(2).
[160] *Id.* § 1531(b).

To reach these goals, Section 9 of the ESA prohibits any person, including any federal agency, from "taking" any endangered species without proper authorization through a valid incidental take permit.[161] The term "take" is statutorily defined broadly as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."[162] The definition of "harm" has been defined broadly by regulation as "an act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering."[163] Courts have found federal agencies liable for take of listed species where agency authorized activities resulted in the killing or harming of ESA-listed species.[164]

Additionally, Section 7(a)(2) of the ESA requires federal agencies to "insure that any action authorized, funded, or carried out by such agency . . . is not likely to jeopardize the continued existence of any endangered species or result in the destruction or adverse modification of [the critical] habitat of such species."[165] "Action" is broadly defined to include "all activities or programs of any kind authorized, funded, or carried out, in whole or in part" by federal agencies and include granting permits and licenses, as well as actions that may directly or indirectly cause modifications to the land, water, or air.[166]

To facilitate compliance with Section 7(a)(2), an "agency shall . . . request" from the Services information regarding whether any listed species "may be present" in a proposed action area, and if so, the "agency shall conduct a biological assessment" to identify species likely to be affected.[167] The agency must then initiate formal consultation with the Services if a proposed action "may affect" any of those listed species.[168]

After formal consultation, the Services issue a biological opinion to determine whether the agency action is likely to "jeopardize" any species' existence. If so, the opinion may specify reasonable and prudent alternatives ("RPAs") that avoid jeopardy.[169] If the Services conclude that the action or the RPAs will not cause jeopardy, the Services will issue an incidental take statement ("ITS") that specifies "the impact, i.e., the amount or extent, of . . . incidental taking" that may occur.[170] When those listed species are marine mammals, the take must first be authorized pursuant to the MMPA, and the ITS must include any additional measures necessary

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[161] 16 U.S.C. § 1538(a)(1)(B); *see also* 50 C.F.R. § 17.31(a) (extending the "take" prohibition to threatened species managed by the U.S. Fish and Wildlife Service)..
[162] 16 U.S.C. § 1532(19).
[163] 50 C.F.R. § 17.3; *see also Babbitt v. Sweet Home Ch. Of Communities for a Great Oregon*, 515 U.S. 687 (1995) (upholding regulatory definition of harm).
[164] *See e.g.*, *Defenders of Wildlife v. Envtl. Prot. Agency*, 882 F.2d 1294, 1300-01 (8th Cir. 1989); *Strahan v. Coxe*, 127 F.3d 155, 163 (1st Cir. 1997).
[165] 16 U.S.C. § 1536(a)(2); 50 C.F.R. § 402.14(a).
[166] 50 C.F.R. § 402.02.
[167] 16 U.S.C. § 1536(c).
[168] 50 C.F.R. § 402.14(a); 51 Fed. Reg. 19,926 (June 3, 1986) ("may affect" broadly includes "[a]ny possible effect, whether beneficial, benign, adverse or of an undetermined character").
[169] 16 U.S.C. § 1536(b); 50 C.F.R. § 402.14(h)(3).
[170] 50 C.F.R. § 402.14(h)(3).

to comply with the MMPA take authorization.[171] The take of a listed species in compliance with the terms of a valid ITS is not prohibited under Section 9 of the ESA.[172]

As explained above, issuance of the Proposed Permit could have several adverse effects on listed species and their critical habitat. Indeed, Region 4 of EPA has previously admitted that wastewater discharges from offshore oil and gas operations might impact ESA-listed species. For example, EPA's Draft EA and biological evaluation on the issuance of a NPDES permit for the Eastern Gulf of Mexico state that sea turtles in the Gulf of Mexico, and the Kemp's ridley in particular, appear to be under stress and that the discharges permitted under the General Permit, including produced water and well treatment fluids, could result in "local minor impacts to sea turtles."[173] Similarly, EPA admitted that the discharges may result in "local minor impacts" to fish, including ESA-listed Gulf sturgeon and smalltooth sawfish.[174]

Nevertheless, EPA states that it believes issuance of the Proposed Permit is not likely to adversely affect sea turtles, Gulf sturgeon, smalltooth sawfish, or any other listed species in the Gulf. Such a determination is arbitrary and capricious. In reaching this determination, EPA appears to rely on prior consultations with NMFS and the FWS. That reliance is improper. An action agency must reinitiate consultation when: (1) the amount of take specified in an ITS is exceeded; (2) new information reveals that the action may have effects not previously considered; (3) the action is modified in a way not previously considered; or (4) new species are listed or critical habitat designated that may be impacted by the agency's action.[175] The information above, such as new studies documenting the harmful impacts of produced water and chemicals used in well stimulation treatments, as well as the amount of offshore fracking occurring in the Gulf of Mexico and the quantity of produced water being discharged, demonstrates that these criteria have been met, triggering EPA's duty to reinitiate consultation.

EPA cannot issue the permit unless and until formal Section 7 consultation is complete and any measures necessary to mitigate the harm to listed species or their critical habitat from the discharge of offshore oil and drilling wastes are including as binding conditions of the permit.

V. Conclusion

In sum, the Proposed Permit does not comply with the ocean discharge criteria or adequately protect water quality because it allows the unlimited discharge of produced water; it allows the discharge of toxic fracking and other well treatment fluids; and is less protective of water quality than other offshore oil and gas permits. EPA must therefore implement substantial changes to the terms and conditions of the Proposed Permit prior to its issuance.

Moreover, prior to issuing the Proposed Permit, EPA must prepare an EIS under NEPA and ensure formal consultation under Section 7 of the ESA is completed, and that any conditions

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[171] *Id*.
[172] 16 U.S.C. §§ 1536(b)(4), (o)(2); 50 C.F.R. § 402.14(i)(5).
[173] EPA, Draft National Pollutant Discharge Elimination System General Permit No. GEG460000 For Offshore Oil and Gas Activities in the Eastern Gulf of Mexico at 4-5; Appx. E at E-5.
[174] *Id.* at 4-17.
[175] 50 C.F.R. §§ 402.16; 402.14(h)(3).

necessary to protect imperiled species or the marine environment from dangerous oil and gas wastewater discharges are included in the permit.

Sincerely,

/s/ Kristen Monsell

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